Abstracts

Low-frequency dispersion features of a new complex mode for a periodic strip grating on a grounded dielectric slab (Dec. 2001 [T-MTT])

P. Burghignoli, P. Baccarelli, F. Frezza, A. Galli, P. Lampariello and A.A. Oliner. "Low-frequency dispersion features of a new complex mode for a periodic strip grating on a grounded dielectric slab (Dec. 2001 [T-MTT])." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2197-2205.

In this paper, novel behavioral features are found for the propagation and radiation of a class of periodic structures often employed in various microwave passive devices and antennas, i.e. a periodic metallic strip grating placed on a grounded dielectric slab. At low frequencies, the dispersion features of the fundamental TE mode are completely different when the grating structure is almost closed, as compared to when it is almost open, that is, when the ratio of the strip width (s) to the grating period (p) is close to unity or close to zero. As is discussed here, this difference led to initially puzzling behavior as the ratio s/p was varied, and the behavior became clear only after a new improper complex (leaky) modal solution was discovered. This paper presents the results of a systematic parametric study of the dispersion features of the new mode in relation to the occurrence of leaky and bound regimes of the fundamental TE mode and also yields information on what ranges of the physical parameters can provide values of phase and leakage (attenuation) constants suitable for a class of practical leaky-wave antennas.

❑ Return to main document.